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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/789,552

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EXAMINER

NGUYEN, LEON VIET Q

ART UNIT	PAPER NUMBER
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2611

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10/17/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/789,552	Applicant(s) SEDARAT, HOSSEIN	
	Examiner Leon-Viet Q. Nguyen	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-8,12,14-17,21,23 and 24 is/are rejected.
- 7) ☒ Claim(s) 3,9-11,13,18-20 and 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>8/9/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to communication filed on 10/8/07. Claims 1 - 24 are pending on this application.

2. Applicant's amendment overcomes the following objection/rejection:

- a. Rejection of claims 1, 2, 4-8, 12, 14-17, 21, 23, and 24 under 35 USC 103(a)

2. Applicant's arguments, see Remarks, filed 8/9/07, with respect to the rejection(s) of claim(s) 1, 2, 4-8, 12, 14-17, 21, 23, and 24 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of over Graziano et al, Tesei et al, Eatwell et al, Peeters et al, and Bolinth et al.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 10/8/07 was filed after the mailing date of 10/8/07. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

4. The drawings are objected to because the word "Assymetric" in fig. 3 should be spelled "Asymmetric". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4, 7, 14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graziano et al (US20030099285) in view of Tesei et al ("Application to locally optimum detection of a new noise model", Acoustics, Speech, and Signal Processing, 1996. ICASSP-96. Conference Proceedings, 1996 IEEE International Conference, May 7-10 1996, Volume 5 pages 2467-2470).

Re claim 4, the Graziano teaches a method, comprising:

measuring a power level of noise for a first tone in a multiple tone signal (¶0012, determining the noise power for each sub-band); and

determining a Gaussian noise power level in the first tone (¶0012, the noise in each sub-band is AWGN. Therefore it is interpreted that the measured noise is Gaussian)

Graziano fails to teach determining if a noise source is generating an asymmetric pattern of noise. However Tesei teaches determining if a noise source is generating an asymmetric pattern of noise (abstract).

Therefore taking the combined teachings of Graziano and Tesei as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the asymmetric noise detecting of Tesei into the method of Graziano. The motivation to combine Tesei and Graziano would be to improve performance and provide better filtering (page 2469, right side, last paragraph).

Re claim 14, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 4. It would be obvious and necessary to have a machine-readable medium storing instructions to execute the method as claimed in claim 4.

Re claim 7, the modified invention of Graziano teaches a method wherein the multiple tone carrier signal is a Digital Subscriber Line signal (§0014 in Graziano, the modem operates according to the G.SHDSL standard).

Re claim 17, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 7.

7. Claim 1, 2, 5, 6, 15, 16 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graziano et al (US20030099285) in view of Tesei et al ("Application to locally optimum detection of a new noise model", Acoustics, Speech, and Signal Processing, 1996. ICASSP-96. Conference Proceedings, 1996 IEEE International Conference, May 7-10 1996, Volume 5 pages 2467-2470) and further in view of Eatwell et al (US5768473).

Re claim 1, Graziano teaches an apparatus comprising:

a multi-tone receiver to detect data in a multiple tone signal (§0011. It is well known in the art that DSL modems transmit and receiver multi-tone signals), the receiver having a detector module to measure a noise power level present in the system (§0012, determining the noise power for each sub-band).

Graziano fails to teach a detector module to detect for an asymmetric Gaussian noise source in the background noise. However Tesei teaches a detector module (page 2469, right side, last paragraph. The detection performance of the LOD test) to detect asymmetric Gaussian noise in background noise (page 2467, left side, last paragraph. modeling background noise in non-Gaussian environments. page 2469, right side, last paragraph).

Therefore taking the combined teachings of Graziano and Tesei as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the asymmetric Gaussian noise detector of Tesei into the apparatus of Graziano. The motivation to combine Tesei and Graziano would be to improve performance and provide better filtering (page 2469, right side, last paragraph).

Graziano also fails to teach a gain module to determine a total noise power level for a tone in the multi-tone signal based upon an equivalent noise power algorithm, the gain module to use the equivalent noise power algorithm to compensate the measured noise power level. However Eatwell teaches a gain module to determine a total noise power level for a signal (fig. 2) based upon an equivalent noise power algorithm (col. 5

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lines 1-9, col. 5 lines 58 - col. 6 line 19), the gain module to use the equivalent noise power algorithm to compensate the measured noise power level (col. 5 lines 1-9, col. 5 lines 58 - col. 6 line 19).

Therefore taking the combined teachings of Graziano and Eatwell as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the gain module of Eatwell into the apparatus of Graziano. The motivation to combine Eatwell and Graziano would be to improve estimates of a signal containing both information and noise (col. 2 lines 61-66).

Re claim 2, the modified invention of Graziano teaches an apparatus wherein the detector module generates a scatter plot of noise error over time (fig. 2 in Tesei. A scatter plot is a well known method of analyzing data. One of ordinary skill in the art would have found it obvious to use a scatter plot or other well known data analysis methods in place of the graph in fig. 2) and the detector analyses a shape of the distribution of the noise error in the scatter plot (fig. 2 in Tesei).

Re claim 5, the modified invention of Graziano and Tesei fails to teach a method comprising:

calculating a gain factor associated with the asymmetric noise pattern; and

applying the gain factor to the measured noise power level to calculate an equivalent total noise power.

However Eatwell teaches a method comprising calculating a gain factor associated with a noise pattern (col. 4 lines 28-38, the Wiener filter gain) and applying the gain factor to the measured noise power level to calculate an equivalent total noise power (col. 5 lines 1-9, the snr is a function of the noise).

Therefore taking the modified teachings of Graziano and Tesei with Eatwell as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the gain calculation of Eatwell into the method of Graziano and Tesei. The motivation to combine Eatwell, Tesei and Graziano would be to improve estimates of a signal containing both information and noise (col. 2 lines 61-66).

Re claim 6, the modified invention of Graziano teaches a method further comprising:

determining a signal-to-noise ratio (col. 5 lines 6-9 in Eatwell) based on a signal power of the first tone (col. 5 lines 6-9 in Eatwell, the power in the snr equation) and the calculated equivalent total noise power (col. 5 lines 6-9 in Eatwell, the noise times the Weiner gain W).

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Re claim 15, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 5.

Re claim 16, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 6.

Re claim 24, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 1.

8. Claims 8 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graziano et al (US20030099285) and Tesei et al ("Application to locally optimum detection of a new noise model", Acoustics, Speech, and Signal Processing, 1996. ICASSP-96. Conference Proceedings, 1996 IEEE International Conference, May 7-10 1996, Volume 5 pages 2467-2470) and further in view of Peeters et al (US20040156441).

Re claim 8, the modified invention of Graziano fails to teach applying a gain factor to an average of the measured noise power to calculate an equivalent total noise power of an effective symmetric Gaussian noise present in the system, if the noise source is generating the asymmetric pattern of noise.

However Peeters teaches applying a gain factor ($|G^k|^2$) to an average of the measured noise power ($E\{|N_m|^2\}$) to calculate an equivalent total noise power (equation (5)).

Therefore taking the modified teachings of Graziano and Tesei with Peeters as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the method of Peeters into the method of Graziano and Tesei. The motivation to combine Peeters, Graziano, and Tesei would be to optimize robustness for narrowband noise near pilot carriers.

Re claim 23, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 8.

9. Claims 12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graziano et al (US20030099285), Tesei et al ("Application to locally optimum detection of a new noise model", Acoustics, Speech, and Signal Processing, 1996. ICASSP-96. Conference Proceedings, 1996 IEEE International Conference, May 7-10 1996, Volume 5 pages 2467-2470) and Eatwell et al (US5768473) and further in view of Bolin et al (US20050047514).

Re claim 12, the modified invention of Graziano fails to teach a method comprising:

determining bit-loading based on the signal-to-noise ratio based on the

equivalent total noise power.

However Bolin teaches a bit-loading device (device 9 in fig. 1) which controls bit loading depending on a signal-to-noise ratio (¶0029).

Therefore taking the modified teachings of Graziano, Tesei and Eatwell with Bolin as a whole, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the application of a bit-loading device of Bolin into the receiver of Graziano, Tesei and Eatwell. The motivation to combine Bolin, Graziano, Tesei and Eatwell would be to provide a multi-carrier system with improved data transfer properties (¶0029).

Re claim 21, all of the claim limitations as recited have been analyzed and addressed in the above rejections with respect to claim 12.

Allowable Subject Matter

10. Claims 3, 9-11, 13, 18-20, and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon-Viet Q. Nguyen whose telephone number is 571-


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270-1185. The examiner can normally be reached on monday-friday, alternate friday off, 7:30AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David C. Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon-Viet Nguyen/
Assistant Examiner Art Unit 2611


DAVID C. PAYNE
SUPERVISORY PATENT EXAMINER